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ZANZIBAR PROTECTORATE

Annual Report

of the

Department of Agriculture

1956

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ZANZIBAR PROTECTORATE

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SECTION A. AGRICULTURE IN THE PROTECTORATE

1. General

The year 1956 was one of stability and a not unsatisfactory level of prosperity. The production and export of the major crops, cloves and coconuts, were well above average although prices remained low throughout most of the year. Ample supplies of imported foodstuffs at reasonable prices contributed to the general disinclination to plant food crops, and the gradual decline in the level of production of home grown foodstuffs, which has been apparent since the war, continued.

Plentiful and well distributed rainfall in the first half of the year was followed by serious drought conditions throughout most of the second half causing a heavy mortality amongst young trees and a temporary scarcity and rise in price of vegetables.

It is satisfactory to report a slight quickening of interest regarding subsidiary export crops although cloves and coconut products accounted once again for 97.6 per cent of the value of the domestic agricultural exports from the Protectorate.

A matter of considerable importance during the year was the discovery in Zanzibar of *Trogoderma granarium*, a serious pest of stored foodstuffs. The discovery caused alarm because, except in one place, the pest has not yet established itself on the neighbouring mainland territories. The disruption of normal trading procedure and the activities of the department in an endeavour to eradicate the pest focussed public attention on the serious losses of foodstuffs caused by insects during storage which are such a feature of the trade in Zanzibar. *Trogoderma* has been brought under control and the introduction of fumigation and insecticidal treatment of both premises and produce has already done much to lessen losses due to other pests.

2. Weather

The belated *vuli* short rains of 1955 continued into an exceptionally wet January. Heavy and frequent storms in January were quite unseasonable and seriously hindered the preparation of land for rice planting. February and early March were dry and the *masika* main rains were timely at the end of March. The main rains were not heavy but remarkably well distributed and of great benefit to all types of agriculturists. These rains usually end in May but, on this occasion, lasted until almost the end of June. The rainfall for the first half year was well above average.

Thereafter very little rainfall was recorded. The *mchoo* showers of July and August did not materialise and the *vuli* rains, which normally occur in November and December, were a failure in almost all areas. Heavy showers in the last few days of the year were a very great relief.

As a consequence of this very dry weather, grazing became almost non-existent in the coral areas and cattle seriously lost condition. In the plantation areas mature clove trees have not made their usual rapid recovery from the harvest, and there have been very extensive losses of seedlings and young saplings. Many wells dried up and, with the exception of preparations for the 1957 rice crop, most agricultural operations were seriously hindered by the dry weather.

The total rainfall for the year, in almost all areas, is well below average in spite of the wet first half-year. Rainfall figures for the several stations in Zanzibar and Pemba are shown as Appendix V to this report.

3. Principal Crops

Cloves.—The crop for the seasonal year, July, 1955 to June, 1956, was a good one, about 40 per cent above average. A total quantity of 13,832 tons (885,225 frasila of 35 lb.) passed through the local markets of which nearly 85 per cent was reaped in Pemba. The current 1956/57 crop is a small one, estimated at 458,000 frasila, and by the end of the year, when harvesting had been practically completed in both islands, only 351,695 frasila of cloves had been marketed. In recent years, the demonstrations and teaching of the department's field staff, combined with a few salutary prosecutions, have led to a fairly general understanding of the fact that excessive branch breaking during clove picking leads to disease. Many plantation owners, particularly in Pemba, now exercise much more care at harvest time and there are some who believe they can already detect a tendency towards more regular annual cropping as a result of more careful picking.

Local internal market prices have been lower than those of last year. From January to November prices per cental (100 lb.) rarely rose much above Shs. 200/- which, being the Clove Growers Association's guaranteed minimum buying price for fair quality cloves in Zanzibar, formed a stable bottom to the market. In the last few weeks of the year, however, internal market prices rose to Shs. 242/-. For most of the year therefore the bulk of the cloves were sold to the Association and the proportion of export consignments which exporters must, by law, purchase from the Association has been 50 per cent for the whole year. The Association is prepared to sell more than this proportion to any exporters who may wish to buy more. The Association's selling price for Grade II cloves was Shs. 245/- per cental until 30th September and thereafter Shs. 255/-. At the end of the year by far the larger part of the stocks of cloves in the Protectorate was in the hands of the Clove Growers Association.

The export duty on cloves was Shs. 64/- per cental until 30th September and thereafter was Shs. 59/-. For exporters who obtained 50 per cent of their cloves from the Association the effect of this reduction in the export duty was exactly counterbalanced by the rise in the Clove Growers Association's selling price. The f.o.b. export prices of cloves thus remained unaffected by these changes.

Cloves exports were 12,044 tons, approximately 33 per cent above the average of the previous five years. Indonesia, as usual the largest buyer of Zanzibar cloves, took 68 per cent and India took 23 per cent.

The Clove Growers Association continued to be the sole buyer of clove stems and the Association's price for those of commercial quality fell by one shilling to Shs. 16/50 per cental on 1st July. Exports of clove oil, distilled by the Association, were 179,939 lb. of which 71 per cent went to the United Kingdom and 29 per cent to the United States of America.

An interesting feature of the clove trade this year was a revival of the old trade in mother-of-cloves to the Far East. Mothers were worth Shs. 35/- per cental in the open market at the end of the year. Some fears have been expressed by local agriculturists that these fruits, although dried, might be used for planting cloves in oversea countries, but careful examination has not revealed viable seed in commercial samples of mother-of-cloves.

Coconuts and Copra.—Exports of coconut products for the year are shewn in the following table:—

	Exports tons	*Copra equivalent tons*
Copra	6,590 ...	6,590
Coconut oil ...	3,617 ...	6,028
Soap	2 ...	2
Copra cake ...	2,615 ...	—
Coconuts	944 ...	215
	Total ...	12,835

For the first time for several years, more copra was exported uncrushed than was processed locally and exported as oil and cake. There has been a gradual trend in this direction for some time as is shewn in the following table which disregards exports of soap and whole coconuts:—

Year	*Percentage exported as uncrushed copra*
1950	0.0
1951	0.3
1952	22.6
1953	42.4
1954	46.7
1955	46.6
1956	52.2

Since copra must pass stringent produce inspection standards before it may be exported, this gradual increase in the amount of copra exported represents a steady improvement in quality, for it is usually more profitable to export uncrushed copra than to process it locally and export oil and cake.

India remained the major buyer of copra but most of the oil went to the East African mainland.

Prices in the local market were uninspiring at Shs. 14/- to Shs. 15/- per frasila until an upward trend in November, due to better prices for oil permitting millers to bid for better quality copra, raised the price per frasila to Shs. 17/50. Prices of unhusked coconuts followed the same trend, being about Shs. 100/- to Shs. 120/- per 1,000 for most of the year and rising to Shs. 140/- in November.

The Copra Board, which administers the proceeds of a cess on exported coconut products, continued to provide valuable services to all sections of the industry. Plantation owners are assisted by the production of large numbers of selected coconut seedlings which are sold far below the cost of production. Copra makers are helped by the services of skilled masons, who assist in the building of improved types of copra kilns, and of instructors who teach the proper methods of making good copra. Certain kiln building materials are also imported and sold to copra makers at cost price. The Copra Products Factory increased its activities during the year by the installation of a hydraulic baling press and a plant for the production of coir fibre from unretted dry husks. The baling press is available for hire to private coir fibre producers and enables them to compress their product to a far greater extent than by hand operated presses and thus greatly reduces the freight rates on the fibre. This has given a useful fillip to the industry. The factory also produces high quality copra, coconut oil and cake. This not only provides a valuable demonstration but local oil millers are able to improve the quality of the oil they export by mixing in a proportion of oil purchased from the Copra Board. The production of brush fibre from retted husks has been abandoned as it is at present believed to be uneconomic. The best quality brush fibre can only be obtained from unripe nuts at the expense of copra quality and it is considered unwise to reverse the present trend towards producing better copra by the introduction of a not very profitable new and minor industry.

4. Subsidiary Export Crops

The local market price of chillies fell disastrously from Shs. 225 per cental at the beginning of the year to Shs. 70 to Shs. 75 in the second quarter. By the end of the year the price had risen slightly to Shs. 125 per cental. This has been a serious discouragement to chillie producers who are mostly villagers in the coral areas whose major cash crop, tobacco, has recently collapsed owing to the refusal of the Government tobacco monopoly in Somalia to continue to buy Zanzibar coil tobacco. The villagers of the eastern and southern seaboards of Zanzibar island have thus had their earning capacity seriously depleted.

Nevertheless, in spite of the very poor price, the production of chillies increased and exports rose again to sixty-two tons, thirteen tons more than last year and thirty-five tons more than 1954.

Now that Somalia, the sole market for Zanzibar's Turkish-type coil tobacco, will take no further supplies, consideration has again been given to the possibilities of introducing Virginian-type tobacco production. Experimental plantings of this type are now being undertaken in co-operation with the East African Tobacco Co., Ltd., a firm of manufacturers which has shewn a most constructive interest in the problem.

Derris exports were only 1,350 lb. and this was mainly the produce of Government farms. Nevertheless there has been a slight increase in derris production in both islands. A small quantity of cacao was again produced on Government plantations and by a few interested private landowners, but the department is not trying to extend this crop at the present time.

Seaweed production continued to make a small but useful contribution to revenue, through culling licences and royalties, and to the earning power of the Protectorate. Some 162 tons were exported, 59 tons less than last year.

5. Food Crop Production

The yields per acre of rice were good in all areas; in Zanzibar the average yield was the highest yet recorded. But the area under cultivation was again reduced and an estimated 8,541 tons of paddy represents the crop from 11,155 acres in both islands. The tendency to rely on imported foods at the expense of home production has always been a feature of the plantation areas but this year it was noticeable also in the coral areas where reduced acreages of maize, sorghum and bulrush millet were observed. Rice planting is made compulsory for all able-bodied males not in full-time employment by the promulgation of planting orders, but these are not effective unless they are backed by prosecutions and these are difficult to justify in times of peace and plenty.

Root crop production has been well maintained, cassava planting especially being undertaken on a considerable scale by mainlanders from Tanganyika. In most areas, however, the very dry weather made the planting of roots in the second half of the year practically impossible.

Records of the quantities of vegetables, fruit and staple foodstuffs passing through the market in Zanzibar town given below are not entirely free from inaccuracies but provide a useful means of comparing production and prices from year to year.

		1954	*1955*	*1956*
Vegetables, baskets		95,188 ...	75,408 ...	54,592
Average price per basket ...	*Shs.*	5.85 ...	*Shs.* 5.76 ...	*Shs.* 5.13
Fruit, baskets		161,758 ...	118,983 ...	63,139
Average price per basket ...	*Shs.*	5.90 ...	*Shs.* 6.63 ...	*Shs.* 5.58
Staple starchy foods, baskets		197,402 ...	156,252 ...	102,202
Average price per basket ...	*Shs.*	7.10 ...	*Shs.* 8.83 ...	*Shs.* 9.20

6. Animal Husbandry

In contrast to 1955, the year was free from outbreaks of infectious diseases. No preventive vaccine inoculations were carried out and, even in the quarantine stations, no cases of dangerious infectious diseases were reported. The valuable co-operation of the veterinary authorities at Mogadiscio ensured that all slaughter cattle from Somalia were inoculated against rinderpest before departure.

Bovine infertility, often caused otherwise than by *Brucella* infection, is causing some disquiet. In Zanzibar island, trypanosomiasis is a major problem but the work of the itinerant trypanosomiasis clinic, in which cattle owners have much faith, is doing much to reduce the incidence of the disease. Fewer cases were reported this year. The Veterinary Officer considers that antrycide remains the most suitable drug for use on privately owned cattle although the use of ethidium bromide on an experimental scale continues.

East Coast Fever continues to take a toll of young calves in both islands although there has been increased interest in spraying during recent years. Dipping remains as unpopular as ever.

The numbers of stock imported, mainly for slaughter, during the year are shewn in the following table:—

	1953	*1954*	*1955*	*1956*
Cattle	5,208	4,784	4,066	5,012
Goats	14,519	14,889	11,964	12,339
Sheep	2,501	2,150	1,442	1,319

Most of this stock came from Tanganyika although Somalia provided a third of the goats and nearly an eighth of the cattle.

There was little change in the consumption of meat compared with previous years, as is shewn in the following table of numbers of animals slaughtered:—

Zanzibar Town Abattoir

	Oxen	*Cows*	*Calves*	*Goats*	*Sheep*
Local stock ...	277	196	187	2,757	—
Imported stock ...	3,926	25	8	11,626	1,538
1956 Total ...	4,203	221	195	14,383	1,538
1955 Total ...	3,618	286	129	14,331	2,120
1954 Total ...	3,958	85	69	15,030	2,232

Zanzibar Rural Districts

No accurate figures are available.

Pemba

	Cattle	*Sheep*	*Goats*
Townships	1,567	68	1,345
Rural areas	1,517	–	129
1956 Total	3,084	68	1,474
1955 Total	4,054	138	1,068
1954 Total	3,436	246	921

In Zanzibar most of the hides and skins produced are prepared and dried in a shed owned and operated by Government. The shed was enlarged during the year and the numbers of hides and skins handled were as follows:—

	Hides	*Skins*
From town abattoir ...	4,413	15,791
From rural areas ...	589	2,588
1956 Totals	5,002	18,379
1955 Totals	3,773	16,275
1954 Totals	4,699	20,544

In Pemba the preparation of hides and skins is in the hands of local butchers and no returns are available.

SECTION B. THE WORK OF THE DEPARTMENT OF AGRICULTURE

1. Staff

The improvement in the senior staff position, which commenced last year, continued into 1956 with the appointment of an Agricultural Officer and an Assistant Agricultural Officer, thus bringing the field staff nearer to full strength.

The Director, Mr. A. K. Briant, O.B.E., was in the Protectorate throughout the year. The Senior Agricultural Officer, Mr. G. E. Tidbury, returned from leave in April and Mr. R. K. Tremlett, who had undertaken the duties of the Senior Agricultural Officer, then went on leave.

The various sections of the department were in the charge of the following officers:—

Pemba district: Mr. D. W. Winter, Agricultural Officer, until October, when he went on leave prior to transfer to Tanganyika and thereafter Mr. R. K. Tremlett, Agricultural Officer. The District Agricultural Officer was assisted by Mr. J. B. de Souza, Field Officer, throughout the year, and by Mr. S. A. Mortished, Assistant Agricultural Officer, who arrived on first appointment in September.

Zanzibar district: Mr. G. I. Walker, Agricultural Development Officer, until June and thereafter Mr. B. Buckler, Agricultural Officer, who arrived on first appointment in August.

Kizimbani Experimental Station: Mr. K. A. Bowden, Agricultural Development Officer, until the completion of his contract in June, thereafter Mr. G. I. Walker. Mr. Y. O. K. Hassania, Field Officer, assisted at Kizimbani until July when he undertook special duties in connection with *Trogoderma* control.

Chemical Laboratory: Mr. J. Jago, Government Chemist, throughout the year.

Produce Inspection: Mr. A. C. E. Callan, M.B.E., Inspector of Produce, who returned from leave in August.

Veterinary Services: Mr. Ahmed Rashid, Veterinary Officer, who was on sabbatical leave from January to August. While Mr. Rashid was away the Veterinary Section was in the charge of Mr. Othman Shariff, Assistant Agricultural Officer.

Government Plantations: Mr. Ali Khamis, Manager of Plantations, who was on leave until February. Mr. I. G. C. Squire took charge of the section in his absence.

The following sections are concerned with current development schemes:—

Citrus Fruit Industry: Mr. I. G. C. Squire, Field Supervisor, throughout the year.

Experimental Control of Clove Diseases: Mr. T. E. C. Robins, Field Officer, who went on leave in June leaving his Pemba work in the charge of the District Agricultural Officer and his Zanzibar work with the Senior Agricultural Officer.

Insect Research: Dr. Vanderplank, Entomologist, throughout the year. His assistant Mr. L. J. Stevens, Field Officer, was on leave from March to July.

Rice Cultivation: Mr. J. R. Clarke, Field Officer, and Mr. J. Proudlove, Mechanical Superintendent, throughout the year.

Fisheries Development: Mr. K. F. King, Fisheries Officer, throughout the year.

Forestry Development: Mr. T. A. Couppis, Forestry Officer, for the whole year. Mr. Couppis was assisted by two Foresters, Mr. A. A. Wadud and Mr. P. Downing.

Agricultural Training: Mr. M. A. Ghassany, Assistant Agricultural Officer, for the whole year.

Mr. L. Paul, Office Superintendent, was in charge of the Head Office clerical staff and assisted the Director throughout the year.

The Director, Mr. A. K. Briant, was awarded the O.B.E. in the Birthday Honours list and Mr. I. G. C. Squire was appointed a member of the Order of the Brilliant Star, Third Class, on the occasion of Id-el-Fitr.

2. The Development Programme

The second Development Programme, which covers the period 1955 to 1959, was in its second year. The new programme, more simply arranged and more flexible than the first, is closely interwoven with work of the department which is financed from Protectorate sources and the following sections of this report describe the year's work in both spheres.

An important change in the financial control of the stock husbandry development schemes was made during the year. Revenue derived from the sale of stock and animal products at the Kizimbani Stock Farm and at the cattle ranches of Hanyegwa Mchana and Tunguu may now be utilised in various ways for the expansion of these schemes. This most valuable provision has enabled the department to expand the activities of the Kizimbani Stock Farm and to increase the numbers of cattle on the ranches, particularly Tunguu, thus enabling management, especially grazing control, to be more effective.

3. Crop Husbandry

Cacao.—Small consignments of *Criollo* cacao, sent to the United Kingdom this year as well as in 1955, remain unsold and this has confirmed the wisdom of changing over from *Criollo* to *Forastero*. Young *Forastero* plantings are making better progress than was hitherto observed with *Criollo*. In trials of vegetative propagation it has been found that coir

dust (the residues from the production of coir fibre from unretted husks) provides a much better rooting medium in the solar propagator than fine sand which was previously the best tried. Better results are also obtained by using the proprietary Seradix B3 than the standard mixture of naphthalene acetic and indole butyric acids to stimulate root production.

Cassava.—Work continued at Kizimbani Experiment Station and minor stations testing the hybrid varieties produced at Amani for yield, palatability, and resistance to mosaic and streak virus diseases. The three varieties selected at Kizimbani from the 1950 batch of twenty-two hybrids are being multiplied and considerable quantities of planting material have been distributed to growers. These three selections do not appear to be so well suited as some of the others to the kinongo soils and variety trials are being continued in these areas. The Kizimbani selections have done well in Pemba.

The eleven 1953 varieties have done very badly in two successive variety trials and it seems doubtful if any of them will prove suitable in Zanzibar. The five 1956 varieties are still in the nursery stage, and are very promising. Sufficient material was received to plant them out in a randomised variety trial.

Chillies.—In spite of a most disappointing fall in price, chillie growers took 512,315 free seedlings from departmental nurseries which are financed by the Clove Growers Association.

It appears that the *kichaa* variety, which is smaller and even more pungent than the standard *hoho* variety is more acceptable to the trade and fetches higher prices. For this reason all the departmental nurseries were re-planted to *kichaa* chillies at the end of the year.

Although prices have fallen, chillies remain a very profitable crop. A block at Kizimbani, which was maintained for two years, produced 1,945 lb. per acre of dry chillies. The major item of expenditure in chillies production is harvesting. This, at Government wage rates, costs approximately 62 cents per pound of dry chillies. Private growers normally pay lower wages than this and, of course, small-holders using family labour obtain very much better net returns. The local market price of chillies at the end of the year was Shs. 1/25 per pound.

Citrus.—Although the planting programme of the Citrus Fruit Industry scheme was fully completed last year, and growers have received adequate bonus payments to enable them to maintain their newly planted orchards in a husbandlike manner, it is most disappointing to record that many of those who benefited under the scheme have sadly neglected their plantations. In many areas grassy weeds, grown tall through neglect, have taken fire and the citrus trees have been destroyed. So far, about one-third of the trees planted under the scheme have been lost through fires.

At the end of 1956 the position of citrus plantings under the scheme was as follows:—

Percentages of Trees originally planted

	In fair condition	*In Poor condition*	*Lost by fire*	*Lost for other reasons*	*Not yet visited*
Limes	51 ...	7 ...	34 ...	6 ...	2
Oranges	47 ...	8 ...	27 ...	14 ...	4
Grapefruit ...	27 ...	7½ ...	59½ ...	4 ...	2
Mandarins ...	39 ...	7 ...	32 ...	19 ...	3
Total	49½ ...	8 ...	33 ...	8 ...	2½

Thus about half the trees planted under the scheme are passable, although many of these are far from good, and, if the indifference of the owners continues, many of these are likely to be lost in future fires. Although Shs. 73,640 was provided this year for bonus payments on healthy trees, less than half this amount could be paid out.

Nevertheless some of the best plantations have been well cared for, especially those of the less affluent small-holders in the south of Zanzibar, and these are now coming into bearing.

The lime trees in the department's demonstration plot at Dole, which were planted a year ahead of the scheme, came partly into bearing. Six of the eight acres of limes planted produced 214,000 fruit, most of which was sold at 20 cents per pound to the Clove Growers Association for the production of juice and oil. The Association also purchased small quantities from private growers. This price was generally considered to be generous and has greatly encouraged the young industry. Even in this first bearing year (the block was planted in 1952) a gross return of Shs. 5,797 was obtained. Net profit for the year worked out at about Shs. 327 per acre over the whole eight acres.

After some initial experimentation, the Clove Growers Association's distillery produced lime oil and lime juice of excellent quality. The oil was sold on the London market for the very acceptable price of Shs. 35 per pound. A few barrels of lime juice were sent overseas but the bulk of the juice was sold locally as cordial or as unsweetened juice. These products have proved most popular in Zanzibar and demand had surpassed supplies by the end of the year. Thus the factory processing and marketing of lime oil and juice has been highly satisfactory but the outlook for fruit production is unfortunately not so bright.

Apart from the apathy of local landowners, the most serious problem of lime production is "withertip" disease. This has caused very heavy losses of fruit and the harvest from the Dole plots would have been far more profitable had it been possible to control the disease. Experiments are in progress testing a proprietary copper spray (Perenox) and a proprietary systemic fungicide (Griseofulvin). Present indications are that Perenox can control the disease to some extent but the economics of spraying have yet to be investigated.

In a block of seedling lime trees at Kizimbani, a number of individual trees shew a very marked resistance to "withertip". Clonal material from these trees has been prepared for establishment in the field in 1957.

At Kizimbani Experiment Station investigations continue into the control of premature fruit fall in oranges by using plant regulators, but conclusive results have not yet been obtained.

Cloves.—In Zanzibar island, work under the scheme for the Experimental Control of Clove Disease made good progress. The second of the three annual plantings was made in experimental blocks of cloves which are being established in areas where the previous generation of clove trees had succumbed to "sudden-death" disease. The young cloves in these experimental plots have made splendid growth and are already a fine demonstration of how to rehabilitate "sudden death" areas. There is as yet no indication that any of the experimental treatments have influenced growth. And it is as yet too early to expect any indications of the onset of "slow decline" disease.

In Pemba island, four sites have been obtained after great difficulty on which to conduct experiments to seek a means of arresting "sudden-death" in the field. Work has commenced on one of them.

In both Zanzibar and Pemba demonstrations of the control of "die-back" disease, by means of pruning and the protection of exposed tissues, have continued and a great deal of public interest is taken in this work. A few private plantation owners have asked for their young trees to be treated and have expressed a willingness to pay for treatment. Consideration is being given to providing a service of this kind. Provided the treatment is confined to saplings, costs are not high. The Zanzibar demonstrations included 2,493 trees at an average cost of Shs. 2/29 per tree. The Manager of Plantations treated 5,409 trees on Government land at an average cost of Shs. 1/98. In Pemba it has been shewn that subsequent, post-harvest, cleaning up of already treated trees costs but a few cents per tree.

At Kizimbani Experiment Station trials have been conducted by the Clove Growers Association on the artificial drying of cloves. A kiln designed on the lines of a pyrethrum drier has, so far, failed to give satisfactory results. A second drier, consisting of trays which can be quickly run under a roof in showery weather, has produced an excellent sample of brightly coloured cloves which, this year at any rate, have a higher oil content than cloves dried on a cement drying-floor in the open in the usual way. Various materials for the trays have been tested and wood appears to be the best. These trials will be continued.

At Kizimbani, also, a number of long-term experiments on establishment, spacing, shade trees, etc., are in progress.

The production of clove seedlings for sale to the public was continued. These seedlings are sold for less than one quarter of the cost of production. In addition, grants from the Clove Growers Association enable a large number of seedlings to be produced and given free to plantation owners. The numbers of seedlings distributed this year were:—

	Free	*Sold*	*Total*
Pemba Island	125,202	119,480	244,682
Zanzibar Island	12,258	188,107	200,365
Total ...	137,460	307,587	445,047
1955 Total ...	105,895	279,049	384,944
1954 Total ...	112,475	168,633	281,108

Coconuts.—The Copra Board again provided funds for the production of coconut seedlings for sale to the public at about one quarter of the cost of production. Some 141,845 seedlings in Zanzibar and 42,075 in Pemba were taken up. The department also supervised the work of the Board's instructors in both islands. These instructors teach copra makers to produce good quality copra and undertake the construction of kilns of approved design. The Director of Agriculture is the Chairman of the Copra Board and the Senior Agricultural Officer is its Secretary. The day to day work of the Board and its financial activities are controlled from the offices of the department.

The dwarf coconuts of the King variety which were obtained from Malaya and planted last year, are not growing satisfactorily.

Investigations into the control of premature nut-fall and the distortion of mature coconuts, which are caused by the sucking Coreid bug, *Pseudotheraptus wayi*, make good progress.

At a meeting of the Inter-territorial Committee for Coconut Pest Research, held in February, it was agreed that a new and more extensive spraying experiment should be undertaken at Kizimbani. In this experiment a 100-acre block of coconuts, with a control area, was to be sprayed with the 10 DRDK formulation of DDT recommended by the Entomologist and using a new and powerful mist blower constructed at the Long Ashton Research Station.

The Entomologist subsequently modified the mist blower by replacing the hydraulic nozzles with a rotary atomiser. This enabled him to restrict droplet sizes to a relatively narrow spectrum around 90 microns which, he has found, is most effective for the 10 DRDK formulation. Tests of the various atomisers were made with the assistance of officers of the Colonial Pesticides Research unit at Arusha.

In November a double application of insecticide at 1½ gallons per acre was completed and the rate of infestation by *Pseudotheraptus*, as assessed by the percentage of the fallen immature nuts and flowers which shew damage, fell from about 46 per cent to about 2 per cent. Comparable figures in the control area were 63 per cent and 50 per cent.

It is intended to re-spray the area as often as necessary and the appropriate times will be chosen according to the extent of damage observable in fallen nuts and flowers. It will be necessary to maintain this experiment for two years in order to observe the results of a full year's spraying in terms of increased yields of nuts.

Coffee.—Interest in coffee planting was well maintained, especially in Pemba. Altogether some 8,829 seedlings were sold from public nurseries.

At Kizimbani, a fertiliser and mulching experiment in its second bearing year again shewed a considerable yield increase due to deep mulching. There has not been any marked response to fertilisers however.

A block of the *excelsa* variety at Kizimbani bore well at 544 lb. of dried beans per acre with a gross return of Shs. 1,630 per acre. *Excelsa* coffee bears more heavily than the *liberica* variety, although *liberica* is preferred in Zanzibar. A small block of *robusta* coffee was maintained but this variety does not appear to be well suited to Zanzibar conditions.

Derris.—There has been a slight quickening of interest in derris root production and some 30,000 rooted cuttings were distributed free to the public from Government nurseries. The production of these cuttings is financed by the Clove Growers Association. A block of derris at Kizimbani produced 995 lb. per acre of dry root, worth Shs. 2,156 if the rotenone content is 5 per cent. (Usually Zanzibar root has a rotenone content of about 7 per cent and earns about 3*d*. per lb. extra.) The cost of production at Kizimbani is approximately Shs. 1,000 per acre and, frequently, yields are well over 1,000 lb. per acre. Derris is clearly a very profitable crop.

In an experiment to ascertain the yield per acre and rotenone content of derris root harvested after a shorter period than the standard 2½ years, plots are being lifted after twelve, eighteen and twenty-four months. Only the twelve months' old plots have been harvested so far. The roots from these plots had the very high average rotenone content of 8.9 per cent but the yield was low at 303 lb. per acre.

Maize.—The testing of maize hybrids bred by the East African Agricultural and Forestry Research Organisation for resistance to the rust *Puccinia polysora* was continued. Although the rust commonly attacks crops of maize in Zanzibar, it normally shews itself too late in the life of the plants to do very much damage. The hybrid varieties generally shew resistance in the form of hypersensitivity but yields are almost always disappointing under Zanzibar conditions unless the crop is very liberally manured.

Pepper.—Experimental blocks of pepper at Kizimbani have been maintained but the plants have made very poor progress.

Pineapples.—Although not grown on a large scale, there is a great deal of interest in pineapple production. One producer is already using a proprietary preparation of the hormone A.N.A. to encourage out-of-season fruiting. Demonstrations at Kizimbani and elsewhere have shewn the value of using coir dust as a mulch, especially on kinongo soils.

Rice.—Demonstration plots, shewing the value of applying artificial fertilisers to rice, were established in the main rice growing areas. Although interest in these plots was not lacking there has been no great increase in the sales of fertilisers to rice growers. At Kizimbani and in Pemba a number of fertiliser experiments were undertaken as part of the long-term programme of investigations into the fertiliser needs of the main crops.

In a variety trial of Trinidad varieties grown at Kizimbani, the variety *Sughandi* yielded 1,200 lb. per acre more than the department's standard variety, *Mngazija*. This variety trial will be repeated next season.

Selection within the variety *Mngazija* continued and a number of strains were selected for further testing next year.

Yams.—Demonstration plots were established in the yam growing areas. These again shewed the remarkable responses to farmyard manure and compost which are a feature of yam growing, and also demonstrated the improved varieties available for distribution from Government farms. In Pemba a yam crop yielded at the rate of 9¼ tons per acre and cost Shs. 569 per acre. The net profit of approximately Shs. 1,500 per acre shews how profitable a crop yams can be, and every effort is being made to popularise it, especially in the kinongo soil areas.

Ylang-ylang.—The extension areas, planted last year to provide larger quantities of flowers for experimental distillations, have made excellent progress. No further samples of oil have been sent to the United Kingdom but the Clove Growers Association disposed of the oil prepared this year on the local market as a perfume: it is very popular.

The Government Chemist, who assists the Clove Growers Association in their experimental distillations, reports that a straight run distillation of fourteen hours gives higher yields of oil than the interrupted distillation over sixteen hours previously thought to be the best. The later distillations yielded oil at the rate of 1.5 per cent of the weight of the flowers and the quality, as judged by laboratory tests, has apparently not suffered.

4. Mechanical Cultivation

The department's mechanical cultivation unit, which is largely financed by a Colonial Development and Welfare scheme to increase the use of tractors, particularly for rice cultivation, commenced operating in October, 1955. The first rice planting season ended in March and was not as successful as it might have been owing to abnormally heavy rains, lack of spare parts, raw and inexperienced drivers and, consequently, a large number of breakdowns. The 1956/57 season has so far been very much more successful. Profiting by last season's experience it was possible to persuade rice cultivators to have their land ploughed betimes and a start was made six weeks earlier than in 1955. A rigid programme was also prepared and adhered to. Although the rice plots are still too scattered and too small, cultivators are becoming aware of the advantages of tractor cultivation and the conditions which make for the best use of tractor-drawn implements. By the end of the year, well over twice the total acreage for the whole of last season had already been dealt with.

Costs are still very high and it has not yet been possible to cover the full costs including supervision and depreciation. The charge for ploughing is Shs. 48/40 per acre and of discing Shs. 24/20 per acre. The average cost (1956/57 season) of these operations in the rice areas was Shs. 75/48 and Shs. 36/99 per acre respectively. These costs are higher

out of season. Thus at present the scheme is running at a loss which, during the rice season, is Shs. 194 per day or Shs. 32/74 per acre. These figures are mainly caused by the long distances the tractors have to travel between plots, the relatively small size of the plots—mostly between half and one acre—and the large number of breakdowns and breakages due to the terrain and the limitations of the drivers. The following figures shew the improvement in the 1956/57 season compared with the previous one:—

	1955/56 season	*1956/57 season to 31.12.56*
Number of hirers	588 ...	1,091
Number of fields ploughed	688 ...	1,341
Average size of fields ploughed ...	0.69 acres ...	0.69 acres
Average acreage per hirer	0.81 ,, ...	0.85 ,,

Between the rice seasons the unit undertook mechanical cultivations in plantations of permanent crops such as coconuts. In most cases these plantations had become overgrown with woody weeds which, in places, formed a dense scrub eight or ten feet high. The Marden weedcutter does a good job under these conditions and the Krause disc-tillers operate well where weeds are less dense. But the amount of damage done to tractors by stumps, ditches and other obstacles when working blindly in heavy weed growth is very considerable and this plantation work causes a heavy financial drain on the scheme. If it is not undertaken, however, the unit must be idle from March to August for there is little other work for the tractors to do.

A single tractor and set of implements was stationed in Pemba under the charge of the District Agricultural Officer.

The departmental workshop, provided under the scheme, gave efficient service and was busy with repairs and servicing throughout the year.

5. Stock Husbandry

Stock Improvement (Kizimbani Stock Farm).—During 1956 permission was granted to utilise the revenue accruing to stock husbandry development schemes for the expansion of the schemes. This has enabled the department to expand the Kizimbani Stock Farm so that bull testing can proceed more expeditiously with a larger number of cows in the herd. The number of cattle in the herd rose from 275 in January to 325 in December. The increased number of completed lactations, however, included a higher proportion of poor performances. The average milk yield in 305 days therefore fell slightly although the average daily yield per cow in milk (the milk index) was maintained at 9.0 lb. This index is not much affected by short lactations. As the very dry weather in the second half-year caused milk yields to fall everywhere, the performance of the Kizimbani herd was quite satisafctory.

Further completed lactations by the daughters of Bull No. 399, "Ndurumo", confirm our assessment of the remarkable influence that this bull has on the performance of his daughters. The milk yields of

twenty-eight of his daughters compared with their twenty-seven dams are as follows:—

	28 daughters	*27 dams*
No. of lactations over 4,000 lb. in 305 days	1	–
No. of lactations 3,000-4,000 lb. in 305 days	10	–
No. of lactations 2,000-3,000 lb. in 305 days	9	9
No. of lactations less than 2,000 lb. in 305 days	8	18

One of the daughters has given the following exceptional performances in her first two lactations:—

	1955	*1956*
Days in milk	329	326
Total yield, lb.	4,429	4,433
Yield in 305 days, lb.	4,215	4,257

As much use as possible is being made of "Ndurumo" who is now blind and less potent than he was. A new bull, No. 1,000, has been bought from the same farm in northern Kenya that bred "Ndurumo".

Experiments with artificial insemination were commenced, using an electrical method of inducing ejaculation, and these are still in progress. The stud bulls which are kept at the outstations of the department for public use have not proved very popular. Although the bulls have been selected because of the performances of their dams and sires, they have not been proven, and often have not the size and appearance to make them popular. A major drawback to the use of stud-bulls bred under tick-free conditions at Kizimbani is that they cannot be sent with impunity to areas where dipping or spraying is not carried out. Moreover the maintenance of stud-bulls in a large number of districts occasions considerable expense.

By adopting artificial insemination methods it would be possible for cattle owners in both Zanzibar and Pemba to obtain semen from those Kizimbani bulls which have the very best parentage and, more important, from any which like "Ndurumo" have already been proven. It is therefore the intention to go ahead with artificial insemination as much as possible although the project is not without its difficulties.

At Kizimbani Stock Farm this year, health has been good and calf mortality fell to 8.0 per cent. There have been no major changes in management. At one time the condition of the newly weaned calves caused some disquiet but more generous feeding caused a rapid improvement. Calves are now not weaned until they reach 200 lb. liveweight instead of 150 lb. as hitherto. The best bred calves are now being brought up on nurse cows (rejects from the recorded herd), and it is found that they reach weaning weight in an average of twenty-eight weeks compared with thirty-two weeks taken by bucket-fed calves.

Pasture Improvement.—A number of pasture grasses, which were recommended as suitable for trial under Zanzibar conditions, were imported from South Africa, Tanganyika and Kenya and established at Kizimbani and on the two coral area ranches at Hanyegwa Mchana and Tunguu. Some of these grasses are growing exceptionally well.

At Kizimbani, fodder grass experiments and productivity recording of the various pasture grasses were continued.

Stock Raising (*Cattle Industry in the Uwanda Areas*).—There are now two cattle ranches, established on hitherto unused open grassy plains, overlying coral, which are being used for beef production.

The longer established of the two, at Hanyegwa Mchana, is now producing fat stock in small but useful numbers and is rapidly expanding without further additions from outside. The herd increased from 371 to 407 head over the year and forty-nine fat bullocks were sold for slaughter. This *uwanda* is about 1,500 acres in extent and the size of the herd will probably be stabilised between 500 and 600 head.

The second *uwanda*, at Tunguu, consists of about 3,000 acres and, after preliminary clearing of tsetse bush in the central area, the herd was started last year. By purchases, mainly from Pemba, and by a large number of births, numbers increased from 183 to 421 head over the year but it will be some considerable time before the herd is large enough to make full use of this area.

In both ranches plentiful and potable water is obtained by windpumps but, in the dry second half of the year, grazing in the cleared areas was exhausted and the cattle lost condition, though not so seriously as was feared. When the drought broke in late December and grass began to grow again, the stock picked up in condition very rapidly. This year's drought provided a valuable testing time for this project. It is unlikely that so serious a drought will occur very often and the cattle came through it very well. The Hanyegwa herd walked several miles daily in search of pasture and the Tunguu herd had to be grazed dangerously near the so far uncleared tsetse infested bush and for this reason the numbers of cases of trypanosomiasis rose considerably.

Trypanosomiasis, under normal conditions, is not a serious problem in these herds and an interesting experiment is in progress whereby trypanosomiasis in the Hanyegwa herd is being treated with antrycide while at Tunguu it is being treated with ethidium bromide. Health on the whole has been excellent in both herds, and calf mortality was only one per cent. The calving rate is also improving from year to year with better health and management thus:—

Year	*Potential dams*	*Calves born*	*Percentage*
1951	29 ...	12 ...	41
1952	69 ...	33 ...	48
1953	83 ...	49 ...	59
1954	59 ...	41 ...	69
1955	121 ...	65 ...	54
1956	130 ...	113 ...	87

One of the urgent problems on these ranches is to ensure that calves are weaned early enough. At present, the cows become badly down in condition, especially in the dry weather, because their calves run with them too long. To overcome this, calf-proof paddocks are being constructed.

Six bulls have been purchased from the beef herd at Ndurumo in northern Kenya. These animals, rather larger than local cattle, are reputed to be early maturing and are the product of many years selection of a pure Boran beef strain under dry and fairly severe conditions.

A second wind pump is being installed at Hanyegwa Mchana. At Tunguu the construction of paddocks by fencing is in progress, an isolation pen has been constructed, and a piped water supply installed so that one small paddock of about two acres can be irrigated in times of drought.

The clearing of tsetse bush was continued at both stations and at Tunguu the clearing is helping to provide a useful barrier to the movement of tsetse flies from the coral rag thickets to the plantation areas of the western side of the island.

Veterinary Activities (*Disease Control*).—In addition to the staff at the Veterinary headquarters at Marhubi, Veterinary Assistants are stationed in the rural areas, as far as possible one in each Mudiria, in both islands. There is also an itinerant clinic which covers the mainroads of Zanzibar island according to an established schedule so that sick animals can be brought to the roadside for treatment. This clinic deals mainly with trypanosomiasis and is very popular indeed.

The following table shews the numbers of sick animals treated by the Veterinary section during the year:—

	Cattle	*Goats and Sheep*	*Donkeys and Mules*	*Dogs and Cats*	*Poultry*	*Pigs*
Zanzibar	3,431	81	67	445	878	15
Pemba	774	15	6	81	1,686	–
Total	4,205	97	73	526	2,564	15

The most common causes of ill-health were helminthiasis, ophthalmia and conjunctivitis, coccidiosis, wounds and, in Zanzibar island only, trypanosomiasis.

East Coast Fever is very prevalent in both islands and, although seven cattle-dips in Zanzibar and three in Pemba are available for use, they are not popular and are used mainly by commercial dairy herds, Government cattle and privately owned cattle which graze on Government land.

Spraying, on the other hand, has become increasingly popular. In Zanzibar, regular spraying was carried out at Chwaka and Makunduchi and last year's attendance figures were doubled this year. In Pemba, spraying is of more recent introduction and has become sufficiently popular for the team to spend three days per week on a route covering twelve spraying stations.

6. Forestry

The activities of the Forestry section of the department concern six different schemes, viz.—

(i) the exploitation and re-afforestation of small areas of high forest,

(ii) the control of exploitation of the mangrove forests,

(iii) the afforestation of widespread areas of thin soil overlying coral,

(iv) the afforestation of infertile pieces of Government land,

(v) the afforestation of the main rainfall catchment area in Zanzibar where erosion is a serious problem, and

(vi) the controlled exploitation of coral area bush by means of shifting cultivation.

In the high forest of Ngezi, in Pemba island, the demarcation and beaconing of compartments continued. Suitable areas are being planted to *Chlorophora excelsa*, a valuable timber tree, and less fertile areas to *Eucalyptus* and other less valuable trees. The concessionnaire commenced work in the first areas to be exploited. Here the vast majority of the trees are of very low value, chiefly *Antiaris toxicaria* and *Odyendia zimmermanii*. These trees tend to split badly when felled and become valueless. Much trouble has been experienced in this way and, so far, no way of overcoming the difficulty has been found. The concessionnaire is losing heart and the future economic exploitation of this forest is in jeopardy. In the Jozani forest in Zanzibar island, *Calophyllum inophyllum* and *Vitex cuneata* have been successfully exploited for a number of years and the work nears completion. Re-afforestation with *Eucalyptus* and *Calophyllum* is in progress and much is done by destroying useless trees and weeds so as to encourage self-sown *Calophyllum* seedlings to develop. The chief difficulties in this forest are the ravages of wild pigs and standing water which covers large areas of the forest for several months of the year.

In the mangrove areas, building poles have been extracted under licence but no bark stripping has yet been allowed. There is a good deal of illicit cutting in the mangrove forests and much resistance to the control measures on the part of nearby villagers. Beaconing has been completed in the mangrove areas.

The afforestation of the open coral plains has been concentrated mainly at the Dunga *uranda*. Old plantings were maintained but casualties were very numerous. Gaps have been supplied and a further 64,000 plants, mostly *Eucalyptus* and *Casuarina*, planted. Fire is the most serious problem. Grass fires sweep across the open plains every year in the dry season and, in a high wind, it is impossible to control them even by wide firebreaks. There has been continued bickering and complaint by the labour force employed on this work and afforestation in this area has not gone ahead as well as was hoped. Nevertheless some parts of the area look quite promising.

Afforestation in certain Government plantations has been undertaken by the Prisons Department with the help and advice of the Forest Officer. During the year, at Kichwele-Pangeni, a further 50 acres were planted, mostly with *Casuarina* and *Eucalyptus* with *Chlorophora* at wide espacement amongst them. The already planted forest at Welezo-Chumbuni was maintained and gaps supplied.

The catchment area on which the water supply of Zanzibar town depends, is the Masingini range of low hills to the north of the town. Part is Government land and a further 205 acres was purchased during the year. The whole area is several square miles. Soil erosion has caused the excavation of vast gulleys and sheet erosion has lowered the fertility of the hill-tops. Check dams planted with bamboo have been constructed in the gulleys and valley bottoms and, in damp areas, *Eucalyptus* is being planted with success. The eroded hillsides and plateaux are more of a problem. Experimental plantings of numerous species are in progress and, so far, the most promising are *Erythrophloeum guineense*, *Peltophorum ferrugineum* and *Casuarina*. Ninety acres have been prepared for planting in the next main rains. This is a long-term project and no further acquisitions of land will be made until successful methods of afforestation have been found and put into practice.

It has not been plain sailing in the Experimental Forest reserve at Makunduchi. Here, 2,860 acres of bush growing on coral karst land have been demarcated and divided and beaconed so that local villagers can exploit the forest, grow crops under a rotational system of shifting cultivation, and then allow the forest to regenerate on traditional lines, but according to a plan which would ensure the maximum economic use of the forest. Although the villagers originally accepted the scheme and appeared quite pleased to co-operate, they have now turned against it and are unwilling to fall in with the planned exploitation. At present there is a deadlock and it is to be hoped that the project will not have to be abandoned.

During the year Government published its intention to create Forest Reserves in the northern Dunga *uwanda*, Jendele plantation, Jozani forest and Makunduchi Experimental Reserve. The next step in these areas is enquiry by the Forest Reserve Settlement Officer, usually the local Mudir, into any claims which members of the public may raise. The Ngezi forest in Pemba has been under enquiry since last year and there are still a number of unsettled claims.

7. Fisheries

The chief aim of the Fisheries section of the department is to introduce small diesel-powered fishing boats capable of operating effective fishing gear. Last year, Government established a hire-purchase scheme whereby suitable boats, made in Denmark, are available complete with all necessary equipment and gear, for £1,150. So far this scheme has made slow but good progress. Six boats have been sold under the scheme and the Fisheries Officer is mainly engaged in teaching their owners how to make the best use of them. There is a strong tendency to use these boats in the traditional manner of small sailing craft and to neglect their capacity for modern fishing methods which are much more profitable. A good example is the use of long lines for shark fishing which necessitates the use of the powered capstan.

Lack of experience and knowledge has led to many breakdowns and loss of tackle, and one boat struck a reef and became a complete loss, luckily with no casualties amongst the crew. There has also been a certain amount of opposition to the scheme by local fishermen who fear that enhanced catches of fish may harm their livelihood. Nevertheless, it is confidently believed that powered fishing will be successfully introduced and that the present project is the best way to foster this important advance.

Owing to the Fisheries Officer's encouragement, local importers are stocking spare parts for these boats and also selling nylon twine and monofilament line. Local fishermen are not slow to appreciate the value of nylon fishing gear.

8. Education

In late 1955 a new method of extension work was started. An Assistant Agricultural Officer, trained at Makerere and Seale Hayne, selected a number of villages in each of which to spend a fortnight at a time holding informal classes in the afternoon and demonstrating improved agricultural methods on cultivators' own land in the mornings.

His work has made fair progress this year but is, clearly, a very long-term project. The Assistant Agricultural Officer now operates in six villages and his classes comprise from seven to ten regular plus a number of casual listeners. He finds a wireless set of great value in starting discussion groups. A demonstration plot has been started in one village but usually the most valuable demonstrations are done with the co-operation of the villagers in their own plots. Thus, fifteen villagers at Upenja this year have agreed to apply fertilisers to a part of their rice plots for demonstration purposes.

At Kizimbani Experimental Station, six pupils are in training for technical posts in the department. This is a two-year course and the pupils are selected from boys who have completed their secondary education.

District Agricultural Officers and their staffs paid the usual visits to rural schools to give advice on school gardening. One useful activity this year was to encourage school children to make nurseries of rough lemon seedlings which they then budded, under the guidance of departmental budders, with orange and other citrus species.

The department gave regular fortnightly broadcasts on the local radio and the more suitable broadcast talks were subsequently published in the Government weekly paper *Maarifa* and printed as hand-outs for the use of the extension staff. Short talks were also given by district staff to gatherings in the villages during performances of the mobile cinema. A quarterly bulletin is published by the department in order to keep local readers informed about the more important departmental activities. Certain local newspapers are pleased to reproduce sections of these bulletins in their columns.

A successful agricultural show was held at Ole in Pemba at which demonstrations of the department's work were given.

A miniature agricultural show was prepared at Kizimbani for the visit of Her Royal Highness the Princess Margaret. Demonstrations of clove and copra production and ancillary products were given together with a display of the subsidary export crops, local foodstuffs and fruit. Her Royal Highness was particularly interested in coconut harvesting and clove-picking.

The Agricultural Advisory Committee in Pemba continued to meet about once every month to discuss agricultural matters. In Zanzibar it was possible once more to appoint a truly representative Committee at the end of the year, and a meeting, the first for many months, was held in November.

9. Distribution of Planting Material

The department once again produced for the public, planting material of the principal and minor cash crops, a number of improved food crops, a wide selection of fruits and a number of forest trees. A list of the material distributed is shewn as Appendix II. Permanent tree crop planting material is normally sold and other planting material is distributed free.

Grants from the Clove Growers Association financed the production of clove seedlings for free distribution and also cacao, coffee, derris and chillie seedlings. Coconut seedlings were produced from a grant by the Copra Board.

10. Government Plantations

An unexpectedly large clove crop on one of the plantations, and a fair crop of coconuts, enabled the Government Plantations section, in spite of low prices, to show a profit of £2,107 on the year's working.

The *mwaka* crop of the 1956/57 season amounted to 212,165 lb. and was fully picked in the 1956 calendar year. The cloves realised an average price of Shs. 201/37 per cental and were sold for the section by the Clove Growers Association.

The following table shews clove harvest figures compared with previous years:—

Season	*Green cloves lb.*	*Dry cloves lb.*	*Dry stems lb.*	*Average clove prices per cental Shs.*
1956—57	212,165 ...	71,455 ...	19,994 ...	198.30*
1955—56	61,916 ...	19,775 ...	5,537 ...	199.32
1954—55	40,480 ...	12,824 ...	3,290 ...	198.83
1953—54	336,078 ...	105,032 ...	32,903 ...	223.36

*The difference between this figure and Shs. 201/37 is due to shrinkage.

Some 7,770 clove seedlings were planted in gaps throughout the plantations but the dry weather in the latter part of the year caused serious losses. Dieback control was a routine measure in young clove areas, some Shs. 10,740 being spent on this operation.

The coconut crop amounted to 2,408,495 nuts compared with 2,551,936 last year and 1,890,341 in 1954. Most of the crop, 2,327,369 nuts, was turned into copra on the section's kilns and a small number of nuts were sold for seed or for eating. The copra production figures for the year were:—

Year	*Nuts made into copra*	*Copra made, tons*	*Nuts per ton of copra*	*Average price of copra per cental*
				Shs.
1956	2,327,369	325	7,153	44.89
1955	2,122,212	306	6,945	40.60
1954	1,867,472	266	7,040	54.25
1953	1,966,502	270	7,282	57.73

Gaps in the coconut plantations were supplied with 1,731 seedlings and routine maintenance of these areas continued throughout the year.

The cacao areas were also maintained and the gaps supplied. There was some extension of the *Forastero* plantings although cacao planting has so far been an expensive business with no commensurate revenue. A small crop was reaped and fermented together with beans from privately owned cacao plantations. This consignment, together with last year's, awaits a sale in the United Kingdom. It is apparently difficult to sell small lots of fine cacao and this is one of the reasons why *Forastero* planting has superseded *Criollo*.

Citrus, on the other hand, brings in early returns. The Plantations section took over the 20-acre pilot plot at Dole established under the Colonial Development and Welfare scheme. Labour costs for cultivations, spraying and harvesting amounted to Shs. 6,770 but the lime area, of which only six acres are bearing, brought in a useful revenue of Shs. 5,557. The orange, grapefruit and mandarin plantings are not yet in bearing.

The Plantations section also maintains a small forestry plantation, produces derris root on a commercial scale and prepares compost for sale to the public. The latter activity is not a paying proposition as compost sells for Shs. 7/50 per ton and costs Shs. 9/46 to produce.

11. Chemical Laboratory

An insect-proof green-house has been constructed to enable the Government Chemist to conduct pot tests of various soils with special attention being given to shortages of trace elements. The year's work has indicated that a possible shortage of sulphur exists in *uwanda* and *kinongo* soils and that nitrogen uptake may depend on adequate supplies of sulphur. A second trace element which appears to be short in the *uwanda* areas is zinc. In the pot tests tomatoes are used as indicator plants. Micro-plots in the field, using maize, are also in progress further to elucidate this problem.

Leaf analyses of lime plants growing at Makunduchi have confirmed the deficiency of potash in this *kinongo* soil. Responses to potash have frequently been obtained in field experiments on this soil type.

A series of microplots on all major soil types in Zanzibar was conducted to ascertain whether the application of magnesium salts would cause yield responses. No significant positive responses have yet been observed.

In addition to investigational work, the routine work of the laboratory this year has included the analyses of 1,992 samples for Government departments and the public. Most of these are for the former and include analyses of coconut oil, cattle-dip fluid, clove oil, cloves, copra and copra cake for the Agricultural Department; milk, water and forensic exhibits for the Health, Public Works and Police Departments.

Samples from the public include coconut oil and cake, and damaged goods on which insurance claims are made.

Assistance was given to the Clove Growers Association in the distillation of lime oil and ylang-ylang oil and in the preparation of lime juice.

12. Produce Inspection

Inspection and grading of produce prior to export under the Agricultural Produce Export Decree this year has included 197,203 bales of cloves, each of 140 lb., which is the largest number of bales presented for export for several years. Copra exports were also the highest for several years and 6,450 tons were inspected and graded. Coconut oil exports fell slightly but 3,556 tons were inspected and sampled by the Inspector of Produce and the samples tested for free fatty acids, moisture and insoluble matter by the Government Chemist. Chillies exports were greater than for many years and the Produce Inspection section inspected and graded 1,904 bags. Although seaweed is not subject to compulsory inspection, the seaweed exporter submits his export consignments for inspection, sampling and testing for moisture and impurities by the Government Chemist.

The section also functions in Zanzibar and in the three Pemba ports under the Adulteration of Produce Decree. This Decree does not include grading but prescribes certain standards of dryness and cleanliness for produce presented for sale or shipment to Zanzibar. The quantities of produce examined under this Decree are shewn in the following table:—

		Failed, bags		
Produce and Origin	*Deliveries, bags*	*Passed, bags*	*Excessive moisture*	*Extraneous matter*	*Percentage of failures*
Zanzibar cloves ...	39,891	37,086	2,443	362	7
Pemba cloves	152,461	133,128	17,687	1,646	13
Total cloves ...	192,352	170,214	20,130	2,008	12
Zanzibar clove stems ...	17,314	16,715	273	326	3½
Pemba clove stems* ...	76,076	73,217	851	2,008	4
Total stems ...	93,390	89,932	1,124	2,334	4
Zanzibar copra ...	170,184	168,731	1,453	–	1
Pemba copra	77,536	75,700	854	982	2½
Total copra ...	247,720	244,431	2,307	982	1½

*Not re-examined in Zanzibar.

The quality of produce in general has been satisfactory. Owing to the dry weather, cloves have been of a bright colour and bold appearance. Pemba cloves, early in the season, tended to contain excessive moisture. Copra continues to improve steadily and failures were few. With the exception of clove-stems, all Pemba produce is inspected at Pemba ports and again on arrival in Zanzibar.

13. Stored Products

In June the British Ministry of Agriculture reported that a consignment of cowpeas had arrived at Liverpool infested by *Trogoderma granarium*. This consignment was found to have been shipped from Zanzibar in February and was the damaged remnants of a consignment previously imported from Burma. The re-exported cowpeas had become unfit for human food and were being sold as cattle food. A search in Zanzibar town brought to light a fairly heavy infestation of *Trogoderma*, almost entirely in cowpeas.

This discovery caused mainland authorities to take urgent steps to avoid the entry of the pest into their territories in imported Zanzibar produce; and shipping companies, almost in a panic, boycotted Zanzibar produce to varying extents. A serious situation then arose very quickly and local trade became disrupted. The valuable transhipment trade, which Zanzibar enjoys, was also jeopardised.

Vigorous action was taken to deal with the pest in Zanzibar with the help and co-operation of officers of the mainland Departments of Agriculture and Maize Control in Kenya, a mainland fumigation company and the local grain and pulse wholesalers. Several officers of the department were placed on full-time *Trogoderma* control.

The importation of cowpeas was temporarily prohibited in order to reduce the stocks of what appeared to be the main food of *Trogoderma* to a minimum. The produce from all infested town premises was fumigated and only returned to the warehouses after they had been throughly cleaned out and heavily sprayed with insecticides. All rubbish and dunnage were destroyed.

A mainland fumigation company arranged to carry out fumigation in Zanzibar. Shipping lines, after much persuasion, agreed to accept consignments which had been inspected and certified free from infestation.

The mainland authorities and the Zanzibar Government promulgated similar legislation requiring certain types of produce from stated countries of origin to be fumigated before shipment.

By the end of August some 1,430 tons of produce had been fumigated and fourteen warehouses cleansed and treated with insecticide. Then, in September, when the pest was well under control, shipments totalling 3,400 tons of rice arrived from Burma badly infested with *Trogoderma* and weevils. This and later cargoes had been fumigated before being shipped but on arrival in Zanzibar it was necessary to order them to be refumigated.

In October, *Trogoderma* was found to have established itself in godowns at a small port in southern Tanganyika. Subsequently there has been a general relaxation of mainland regulations and all imports from Zanzibar except secondhand gunny bags, are allowed in, subject to inspection at the port of entry. Secondhand bags have to be fumigated before they leave Zanzibar.

It is now necessary for an Inspector from this department to board all ships for the inspection of cargoes and, if necessary, to order fumigation at the time of landing, preferably in the lighters. By the end of the year satisfactory control of *Trogoderma* had been effected although the pest had not been completely eradicated.

Losses through insect pests of stored pulses and grains in Zanzibar have always been very serious; it is believed that as much as 10 to 15 per cent is lost in this way. Foodstuffs are stored in a multitude of small warehouses most of which are parts of dwelling houses. This has created a problem which has been appreciated for several years but not solved. The discovery of *Trogoderma* has given much publicity to the whole subject of pests of stored products and much is now being done to reduce losses. Many warehouses have been cleansed, many importers are voluntarily mixing an insecticide with all their imported pulses, and most importers have shown great willingness to co-operate with the authorities.

The lack of permanent fumigation facilities in Zanzibar and the lack of proper storage warehouses are, however, still major difficulties which need to be overcome.

14. Principal Agricultural Legislation

No Decrees of agricultural importance were promulgated in 1956. The following is a list of the more important Orders, etc., published during the year:—

Government Notice No. 41.	The Defence (Land Requisition and Personal Service) (Planting of Cassava) Order, 1956. Provides for the compulsory planting of cassava in Pemba for the cultivator's own use.	8.6.56
Government Notice No. 47.	Notice of intention to constitute a Forest Reserve at Dunga Uwanda (Uzini).	20.6.56
Government Notice No. 48.	Notice of intention to constitute a Forest Reserve at Makunduchi Uwanda.	21.6.56
Government Notice No. 49.	Notice of intention to constitute Jozani Forest a Forest Reserve.	21.6.56
Government Notice No. 50.	Notice of intention to constitute a Forest Reserve at Jendele Shamba.	21.6.56
Government Notice No. 59.	The Plant Protection (Declaration of Pests) Order, 1956. Declares the beetle *Trogoderma granarium* to be a pest under the Plant Protection Decree, 1937.	28.7.56

Government Notice No. 60.	The Customs Management (Prohibition of Import of Cowpeas) Order, 1956. The importation of cowpeas was temporarily halted as part of the compaign to control *Trogoderma*.	28.7.56
Government Notice No. 61.	Standard clove-picking contracts for the 1956/57 season.	1.8.56
Government Notice No. 67.	The Customs Management (Prohibition of Import of Cowpeas) (Amendment) Order, 1956. Amends the Order, Government Notice No. 60 above, to enable cowpeas, shipped before the promulgation of that Order, to be imported.	16.8.56
Government Notice No. 77.	The Plant Protection (Compulsory Fumigation of Imports) Order, 1956.	14.9.56
Government Notice No. 85.	The Plant Protection (Compulsory Fumigation of Imports) (Amendment) Order, 1956.	12.10.56
Government Notice No. 94.	The Plant Protection (Compulsory Fumigation of Imports) (Amendment) (No. 2) Order, 1956.	22.10.56
Government Notice No. 105.	The Plant Protection (Compulsory Fumigation of Imports) (Amendment) (No. 3) Order, 1956.	7.11.56
	The above four Orders provide powers to order the fumigation of any produce infested with *Trogoderma* and also require certain types of produce to be fumigated prior to shipment to Zanzibar.	
Government Notice No. 120.	The Defence (Land Requisition and Personal Service) (Rice Planting) (Pemba) Order, 1956. Provides for the compulsory planting of rice in Pemba for the cultivators' own use.	7.12.56

A. K. BRIANT,
Director of Agriculture

6th March, 1957

Appendix I

STATEMENT OF REVENUE AND EXPENDITURE OF THE GOVERNMENT PLANTATIONS

Revenue to the Nearest £

	Kidichi	*Selem*	*Mtoni*	*Chukwani*	*Jendele*	*Total*
	£	£	£	£	£	£
Cloves and stems	6,997	973	102	–	276	8,348
Copra	9,988	1,733	2,795	1,592	–	16,108
Coconuts	616	118	60	81	–	875
Coconut crops	–	23	190	99	24	336
Miscellaneous	498	99	373	20	5	995
Hire of lorry	21	10	5	5	–	41
Leased plantations	–	53	–	–	–	53
Rent of quarters	21	6	6	6	–	39
Total ...	18,141	3,015	3,531	1,803	305	26,795
Deduct value of produce brought forward	1,380	57	155	383	–	1,975
Balance ...	16,761	2,958	3,376	1,420	305	24,820
Add value of produce carried forward	492	–	158	346	–	996
Total ...	17,253	2,958	3,534	1,766	305	25,816

Expenditure to the Nearest £

	Kidichi	*Selem*	*Mtoni*	*Chukwani*	*Jendele*	*Total*
	£	£	£	£	£	£
Personal Emoluments:						
Headquarters staff	1,303	271	273	194	25	2,066
Field staff	1,577	396	419	193	–	2,585
Total ...	2,880	667	692	387	25	4,651
Deduct leave salary of S. F. A. Said Omar	74	37	19	19	–	149
Total Personal Emoluments ...	2,806	630	673	368	25	4,502
Other Charges:						
Transport and Travelling ...	119	58	28	25	21	251
Materials and tools	105	29	11	6	8	159
Labour	10,671	2,583	2,227	2,065	732	18,278
Repairs to building	296	90	139	149	–	674
Fuel and maintenance of vehicles	155	78	39	39	–	311
Total ...	11,346	2,838	2,444	2,284	761	19,673
Deduct capital expenditure by Forest Office	–	–	–	–	516	516
Balance ...	11,346	2,838	2,444	2,284	245	19,157
Add outstandings valued at ...	25	13	6	6	–	50
Total Other Charges ...	11,371	2,857	2,450	2,290	245	19,207
Total Expenditure ...	14,177	3,481	3,123	2,658	270	23,708
Profit	3,076	–	411	–	35	3,522
Loss	–	523	–	892	–	1,415

Net profit — £2,107.

Appendix II

DISTRIBUTION OF PLANTING MATERIAL

Planting material of food-crops is usually distributed free, plants of permanent economic crops are normally sold.

Avocado pear, grafted	Nos.	32
,, ,, seedlings	,,	35
Banana, suckers	,,	224
Betel nut, seedlings	,,	135
Cacao, seedlings	,,	3,286
Carambola, seedlings	,,	24
Cassava, cuttings	,,	93,300
Chillies, seed	lb.	106
,, seedlings	Nos.	512,315
Cinnamon, seedlings	,,	60
Clove, seedlings	,,	445,047
Coconut, seedlings	,,	183,920
Coffee, seedlings	,,	8,829
Derris, rooted cuttings	,,	29,570
Durian, seedlings	,,	94
Eugenia aquea, marcotts	,,	19
E. javanica, marcotts	,,	11
E. ,, seedlings	,,	115
E. malaccensis, seedlings	,,	520
Grapefruit, budded	,,	161
Groundnuts, seed	lb.	27
Guava, seedlings	Nos.	30
Kapok, seedlings	,,	4,750
Lemon, smooth, budded	,,	15
Lime, budded	,,	214
,, seedlings	,,	232
,, sweet, budded	,,	119
,, ,, seedlings	,,	51
Litchi, marcotts	,,	90
Madras thorn, seedlings	,,	5,250
Maize, seed	lb.	218
Mandarins, budded	Nos.	527
,, seedlings	,,	51
Mango, grafted	,,	297
Nutmeg, seedlings	,,	328
Oranges, budded	,,	2,673
Pepper, black, seedlings and rooted cuttings	,,	376
Pineapple, suckers	,,	270
Pomelo, budded	,,	85
Rambutan, seedlings	,,	423
Rice, seed	lb.	586
Sapodilla, marcotts	Nos.	15
,, seedlings	,,	328
Soursop, seedlings	,,	63
Star Apple, seedlings	,,	21
Sweet potatoes, vines	,,	66,700
Yams, tubers	lb.	3,372

Appendix III

DOMESTIC EXPORTS, 1956

Items	*Unit of Quantity*	*Quantity*	*Value*	*Percentage of Total value*
			£	
Cloves	Cental of 100 lb.	269,775	3,924,117	79.41
Clove bud and stem oil	lb.	179,939	90,757	1.84
Copra	ton	6,590	382,312	7.74
Coconuts	cwt.	18,889	28,962	0.59
Oil cake	,,	52,308	66,322	1.34
Soap, common and toilet	,,	38	121	–
Coconut oil	,,	72,337	327,808	6.63
Mangrove bark	ton	–	–	–
Chillies	cwt.	1,232	14,057	0.28
Fruit, fresh	,,	2,570	2,774	0.06
Beche-de-mer	,,	395	4,035	0.08
Tobacco, unmanufactured	lb.	–	–	–
Ox hides	cwt.	816	5,812	0.12
Skins, sheep and goat	,,	232	1,785	0.04
Livestock	No.	6	105	–
Forest products	value	–	1,103	0.02
Kapok	cwt.	–	–	–
Fibres, manufactured	ton	62	4,393	0.09
Shells, marine	cwt.	4,969	33,142	0.67
Fish, dried or salted	,,	138	1,430	0.03
Fish, fresh	,,	–	–	–
Lime	,,	13,847	4,376	0.09
Seaweed	ton	162	9,404	0.19
Other unclassified natural products	–	–	–	–
Other articles	–	–	38,938	0.78
	Total		4,941,753	100.00

Appendix IV

APPROXIMATE PRODUCTION OF CLOVES IN FRASILA OF 35 lb. FOR THIRTY-FIVE CROP YEARS

(1st July to 30th June)

(Based on receipts of cloves at the Central Market and C.G.A.)

Season	*Zanzibar Frasila*	*Pemba Frasila*	*Total Frasila*	*Mean crop per season in 5-year periods Frasila*
1921/22	65,819	200,983	266,802	—
1922/23	291,417	690,498	981,915	—
1923/24	75,027	236,767	311,794	—
1924/25	240,952	520,490	761,442	—
1925/26	219,192	392,622	611,814	586,753
1926/27	203,843	529,186	733,029	679,998
1927/28	190,370	500,382	690,752	621,766
1928/29	74,828	125,740	200,568	599,521
1929/30	318,647	610,296	928,943	633,021
1930/31	51,796	201,320	253,116	561,281
1931/32	175,070	760,786	935,856	601,847
1932/33	242,772	244,594	487,366	561,170
1933/34	146,098	781,090	927,188	706,494
1934/35	360,037	503,415	863,452	693,395
1935/36	65,938	232,571	298,509	702,474
1936/37	45,096	351,568	396,664	592,636
1937/38	446,500	909,416	1,355,916	768,346
1938/39	39,879	115,211	155,090	613,926
1939/40	168,041	501,474	669,515	575,139
1940/41	146,323	575,277	721,600	659,757
1941/42	297,578	889,550	1,187,128	817,850
1942/43	40,049	223,691	263,740	599,414
1943/44	263,423	777,218	1,040,641	776,525
1944/45	200,417	459,396	659,813	774,584
1945/46	26,493	161,075	187,568	667,778
1946/47	170,280	924,329	1,094,609	649,074
1947/48	30,914	280,986	311,900	658,906
1948/49	81,700	310,971	392,671	549,312
1949/50	153,888	430,253	584,141	514,178
1950/51	158,588	1,081,786	1,240,374	724,739
1951/52	45,892	290,007	335,899	572,977
1952/53	91,417	82,328	173,745	545,366
1953/54	179,883	1,101,302	1,281,185	723,069
1954/55	97,944	448,927	546,871	715,615
1955/56	139,132	746,093	885,225	644,585
Average for 35 seasons	158,436	491,187	649,623	—

Appendix V

MONTHLY AND ANNUAL RAINFALL TOTALS FOR THE YEAR 1956 FOR STATIONS IN ZANZIBAR AND PEMBA

		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total 1956	Total 1955
Kigomasha ...	Rainfall in ins. ...	7.67	0.09	1.36	9.54	12.12	5.51	2.75	2.10	2.27	4.95	2.00	3.24	53.60	61.97
	No. of wet days ...	13	1	5	23	26	16	8	7	12	16	11	10	148	136
Matangatwani ...	Rainfall in ins. ...	7.22	0.21	5.19	12.85	12.01	6.04	1.18	0.36	2.07	2.16	5.17	2.67	57.13	65.00
	No. of wet days ...	15	3	13	28	30	21	7	4	11	7	13	11	163	154
Weto	Rainfall in ins. ...	9.07	0.12	0.71	16.38	8.93	4.36	1.14	–	0.76	2.19	5.61	5.72	58.99	78.60
	No. of wet days ...	12	1	12	26	27	14	4	–	6	5	9	13	129	118
Mkoani	Rainfall in ins. ...	7.06	0.77	1.28	15.49	8.82	4.97	2.00	0.08	0.66	0.22	4.34	3.53	49.22	92.42
	No. of wet days ...	11	2	6	21	22	15	6	1	7	2	6	12	111	115
Mkokotoni ...	Rainfall in ins. ...	2.51	1.00	3.20	7.49	7.49	5.36	2.63	2.30	5.86	8.82	1.54	0.54	48.74	53.93
	No. of wet days ...	4	3	6	19	18	18	8	15	11	15	5	4	116	96
Mtambile	Rainfall in ins. ...	8.60	2.29	10.51	16.91	10.21	3.95	1.61	0.06	0.53	0.93	1.21	8.67	65.48	110.15
	No. of wet days ...	20	11	19	27	19	16	8	1	8	7	7	17	160	182
Wesha	Rainfall in ins. ...	13.03	3.94	7.57	14.88	7.05	4.47	0.84	0.28	0.66	0.27	3.67	4.82	60.88	87.26
	No. of wet days ...	10	7	13	18	23	16	7	5	10	9	10	16	144	150
Mkwajuni	Rainfall in ins. ...	8.22	1.81	4.33	17.12	9.56	4.26	1.06	2.25	2.23	1.10	1.75	2.95	56.64	57.05
	No. of wet days ...	14	2	12	28	28	19	9	11	14	5	9	9	160	152
Limbani	Rainfall in ins. ...	12.77	0.81	8.55	14.76	10.67	5.05	0.99	0.09	1.65	2.70	2.51	5.88	66.43	75.45
	No. of wet days ...	18	6	18	27	29	21	8	3	11	5	11	16	173	158
Ole	Rainfall in ins. ...	5.10	0.70	6.37	12.71	8.64	3.32	1.13	0.14	0.55	1.14	0.39	2.44	42.63	69.74
	No. of wet days ...	15	4	13	25	22	14	4	2	7	7	5	6	124	135
Chambani	Rainfall in ins. ...	6.28	3.54	3.16	15.91	8.34	3.39	0.69	0.17	0.13	0.40	2.76	8.32	53.09	80.72
	No. of wet days ...	13	9	10	22	25	14	7	2	3	2	8	13	128	107

Kisongoni	Rainfall in ins. ...	11.66	2.35	7.59	9.85	8.67	3.03	0.70	0.83	1.31	0.96	0.86	1.25	49.96	62.18
	No. of wet days ...	10	5	10	24	19	12	4	7	8	3	6	4	112	122
Chake Chake ...	Rainfall in ins. ...	11.25	4.81	12.31	33.98	16.04	13.46	1.35	0.76	0.42	1.34	2.02	6.82	104.56	136.99
	No. of wet days ...	15	6	13	24	27	19	6	2	7	7	9	13	148	137
Selem	Rainfall in ins. ...	5.03	0.22	5.81	11.97	5.24	1.64	0.37	1.34	1.88	1.83	2.22	4.78	42.33	57.67
	No. of wet days ...	15	4	17	27	27	14	5	7	10	11	11	14	162	152
Kizimbani	Rainfall in ins. ...	9.25	0.83	10.37	17.35	6.62	2.37	0.73	1.71	2.70	3.67	0.83	3.19	59.62	73.56
	No. of wet days ...	14	6	19	25	30	18	7	7	14	15	11	13	179	148
Victoria Gardens ...	Rainfall in ins. ...	7.78	0.80	5.40	16.34	6.69	1.84	0.28	0.77	1.59	1.43	0.77	4.17	47.86	66.85
	No. of wet days ...	15	4	11	25	16	8	4	8	8	12	6	13	130	120
Makunduchi ...	Rainfall in ins. ...	3.66	0.20	1.72	16.24	6.85	3.35	1.14	0.34	0.51	0.07	0.09	1.80	35.97	73.61
	No. of wet days ...	7	1	3	14	11	8	2	2	2	2	2	4	58	92
Mwera	Rainfall in ins. ...	10.52	1.94	6.19	23.19	13.57	2.75	0.43	0.18	1.16	2.58	1.44	3.31	67.26	85.06
	No. of wet days ...	9	4	13	15	12	4	3	2	6	8	6	11	93	100
Hanyegwa Mchana	Rainfall in ins. ...	7.16	2.18	6.97	12.67	8.73	3.91	1.08	0.39	1.55	1.84	1.11	1.11	48.70	70.70
	No. of wet days ...	12	5	16	24	25	18	10	3	7	6	5	9	140	138
Muongoni	Rainfall in ins. ...	7.46	0.24	4.75	12.61	7.91	3.69	0.66	0.14	0.86	0.81	2.05	2.62	43.80	66.59
	No. of wet days ...	13	2	11	23	19	19	3	2	7	4	6	7	116	138
Kisauni	Rainfall in ins. ...	8.41	0.64	5.74	21.34	6.83	2.05	0.09	0.24	1.05	0.56	1.14	4.09	52.18	65.08
	No. of wet days ...	17	7	15	25	19	7	3	3	10	8	6	16	136	139
Tunguu	Rainfall in ins. ...	5.13	2.72	5.52	15.54	10.03	3.08	0.63	0.71	1.42	1.11	1.31	5.10	52.30	*
	No. of wet days ...	12	7	15	28	18	10	2	3	4	4	6	9	118	–
Chwaka	Rainfall in ins. ...	8.82	1.45	2.03	23.67	15.95	5.97	0.80	*C*	*L*	*O*	*S*	*E*	*D*	*	61.01
	No. of wet days ...	10	2	5	16	21	10	2	–	–	–	–	–	–		64

*Record incomplete.